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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,804	02/27/2004	Feng Shi	13854-065001	5657
26181	7590	06/16/2005	EXAMINER	
FISH & RICHARDSON P.C. PO BOX 1022 MINNEAPOLIS, MN 55440-1022			TRAN, DZUNG D	
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Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No. 10/789,804	Applicant(s) SHI ET AL.	
	Examiner Dzung D Tran	Art Unit 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2004.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22 is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-21 and 23 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>03/31/2005</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 18-20 are objected to because of the following informalities:

Since claim 8 is an apparatus claim and the claims 18-20 clearly are the apparatus claims.

In claim 18, line 1, "The method according to claim 8" should be change to "The apparatus according to claim 8".

In claim 19, line 1, "The method according to claim 8" should be change to "The apparatus according to claim 8".

In claim 20, line 1, "The method according to claim 8" should be change to "The apparatus according to claim 8".

The change is required to provide a consistency between the claims.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 21 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 21 recites the limitation:

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$$\begin{aligned} \text{"CV}(l, t) = & [\sum a_i(k, t) h1(L-K-1, t) + on1(t)]^2 \\ & + [\sum a_i(k, t) h2(L-K-1, t) + on2(t)]^2 \\ & + en(t) \end{aligned}$$

However, "k" value is not described in the specification.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-4, 7-11, 13, 15-20 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Kurooka et al. U.S. (Patent no. 6,694,273).

Regarding claims 1 and 17, Kurooka, in figure 18, discloses a dispersion compensation device/method comprising:

an optical variable dispersion compensator 5A (equivalent to Optical domain Adaptive Dispersion Compensation Module (OADCM) ;

an equalization amplifier 5 (equivalent to Electrical domain Adaptive Distortion Compensation Module (EADCM)); and

a controller 35 coupled to and operable to selectively control both the OADCM and the EADCM (see figure 18).

Regarding claim 2, Kurooka, in figure 18, clearly discloses the controller 35 controls operating characteristics of at least one of the OADCM and the EADCM.

Regarding claim 3, Kurooka further discloses the controller 35 controls the OADCM based on feedback information provided to the controller from the an equalization amplifier 5 (equivalent to EADCM).

Regarding claim 4, Kurooka further discloses the controller 35 controls the equalization amplifier 5 (equivalent to EADCM) based on feed forward information provided to the controller from the OADCM (see figure 18).

Regarding claim 7, Kurooka further discloses optical receiver (e.g. photodetecting device 2) integrate with an optical variable dispersion compensator 5A (equivalent to OADCM), wherein the equalization amplifier 5 (equivalent to EADCM) provides signal distortion measurements to the controller 35 (e.g., the output signal of equalization amplifier 5 is connected an equalizer monitor and multi-phase eye quality monitor 8, through control circuit 9 to controller 35, see figure 18). The controller 35 generates a dispersion compensation control signal corresponding to dispersion compensation quantity correction value (e.g., from the eye pattern of input waveform and equalization amplified waveform monitoring) then supplying it to the optical variable dispersion compensator 5A (equivalent to OADCM) (col. 22, line 13 to col. 23, line 13).

Regarding claim 8, Kurooka further discloses the equalization amplifier 5 (e.g. EADCM) provides polarization mode dispersion compensation (Col. 4, lines 32-34, Col. 7, lines 15-18).

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Regarding claim 9, Kurooka discloses the optical variable dispersion compensator 5A (e.g. OADCM) provides chromatic mode dispersion compensation (Col. 24, lines 25-32).

Regarding claim 10, Kurooka discloses the equalization amplifier 5 (e.g. EADCM) include an equalizer monitor 8 that produces symbol estimate.

Regarding claim 11, Kurooka discloses the equalization amplifier 5 (e.g. EADCM) include a multi-phase eye quality monitor 8 (equivalent to blind equalizer) (e.g., it is well recognized in the art for use eye pattern for determine the error values).

Regarding claim 13, Kurooka discloses the equalization amplifier 5 (e.g. EADCM) comprising: a multi-phase eye quality monitor and equalization circuit (figure 18, element 8).

Regarding claim 15, Kurooka discloses the equalization amplifier 5 (e.g. EADCM) comprising: equalization circuit 8 is a distortion equalizer.

Regarding claim 16, Kurooka discloses in figure 18, the distortion equalizer is a decision feedback equalizer (e.g., information signal from equalization circuit 8 is feedback to the equalization amplifier 5 (equivalent to EADCM) to decision unit 7).

Regarding claim 18, as far as examiner understood, Kurooka discloses the equalization amplifier 5 (e.g. EADCM) provides signal quality distortion measurement (e.g., through equalization circuit 8) to the controller 35.

Regarding claims 19 and 20, as far as examiner understood, Kurooka discloses the equalization amplifier 5 (e.g. EADCM) provides signal error value and symbol error estimates (e.g., through a multi-phase eye quality monitor 8) to the controller 35.

Regarding claim 23, Kurooka discloses the method comprising:

a controller 35 for collecting a set of error measurement from a multi-phase eye quality monitor 8 of figure 18 and for computing, selecting and generating a dispersion compensation control signal corresponding to dispersion compensation quantity correction value from the eye pattern of input waveform and equalization amplified waveform monitoring 8 (i.e., detecting and determining the bit errors) then supplying it to the optical variable dispersion compensator 5A (equivalent to OADCM) (col. 22, line 13 to col. 23, line 13).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurooka et al. U.S. (Patent no. 6,694,273) in view of Wan et al. U.S. (Publication no. 2004/0086274).

Regarding claim 5, Kurooka discloses all the limitations except for an Optical Amplifier with Automatic Gain Control (OAGC). Wan discloses an optical system comprises an Optical Amplifier with Automatic Gain Control (OAGC) (figure 1, element 112, page 4, paragraph 0092). One of the ordinary skill in the art would have been

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motivated to incorporate optical amplifiers along the optical transmission line in order to boost the light signals that become attenuated during the transmission. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to incorporate an optical amplifier such as Optical Amplifier with Automatic Gain Control (OAGC) taught by Wan along the transmission line or coupled it with the OADCM and the controller in the system of Kurooka. It is notoriously known that optical amplifiers can be placed anywhere along the transmission path in an optical system to boost the signal and to restore the signal strength so that acceptable or good quality signal can be received.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurooka et al. U.S. (Patent no. 6,694,273) in view of Wan et al. U.S. (Publication no. 2004/0086274) and further in view of O'Sullivan et al. U.S. (Patent no. 5,822,094).

Regarding claim 6, the combination of Kurooka and Wan discloses all the limitations except system further comprises a PIN photodiode detector in combination with a trans-impedance amplifier (PIN/TIA). O'Sullivan discloses an optical system having a photodiode comprises a PIN photodiode detector in combination with a trans-impedance amplifier (PIN/TIA). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to replace the photo-detecting device 2 of Kurooka with the PIN photodiode detector in combination with a trans-impedance amplifier taught by O'Sullivan. One of ordinary skill in the art would have been motivated to do this since PIN photodiode detector in combination with a trans-



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impedance amplifier offers advantages over the photodiode that is converts the incident light into an electrical current which is amplified amplified and band limited between the desirer range of bandwidth by the trans-impedance amplifier instead of converts the incident light into an electrical current only.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurooka et al. U.S. (Patent no. 6,694,273).

As per claim 1 above, Kurooka discloses all the limitations except for an optical transmitter connect to the receiving apparatus 1. However, Kurooka discloses in figure 20 (prior art figure) an optical transmitting apparatus 200 (equivalent to transmitter) coupled to the receiving apparatus 400 through amplifier 300. At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to include the optical transmitting apparatus 200 of figure 20 in the system of figure 18 of Kurooka that is connect the optical transmitting apparatus 200 to the receiving apparatus 1 over an optical fiber 30. One of ordinary skill in the art would have been motivated to do this in order to generate an optical signal and transmits it to the receiver end. Furthermore, the Drawing of Specification does not show the optical transmitter as claimed in claim 12.

10. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. Claim 22 is allowed. The following is an examiner's statement of reasons for allowance: The prior art of records does not teach or suggest a device for providing "a method of Blind Channel Initialization, the method comprising:

- i) calculating tap-weight vectors  $h_1$  and  $h_2$ , each having respective elements;
- ii) operating an Electrical domain Adaptive Dispersion Compensation Module until it reaches a static status;
- iii) Computing a first mean square error value;
- iv) shifting elements of the tap-weight vector  $h_2$  by one element and repeating step iii) to obtain a second mean square error value;
- v) repeating step iv) until a first non-zero element reaches an end of tap-weight vector  $h_2$ , thus obtaining a first set of mean square error values;
- vi) shifting the elements of the tap-weight vector  $h_1$  by one element and repeating steps iii) to v) to obtain a second set of mean square error values;
- vii) halving the original values of the two left-most non-zero elements in both  $h_1$  and  $h_2$  and repeating steps iii) to vi) to obtain a third set of mean square error values;
- viii) doubling the original values of the two left-most non-zero elements in both  $h_1$  and  $h_2$  and repeating steps iii) to vi) to obtain a fourth set of means square error values;
- and ix) selecting a smallest mean square error value of the combined first means square error value, second mean square error value, and the first, second, third and fourth sets of mean square errors values corresponding to values that are best initial values of tap-weight vectors  $h_1$  and  $h_2$ ." in claim 22.

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- a. Ramachandran et al. U.S. patent no. 5,671,075. Optical transmission system
  - b. Antos et al. U.S. patent no. 5,361,319. Dispersion compensating devices and system
  - c. Sarkimukka et al. U.S. publication no. 2001/0046348. Multi wavelength/multi-channel system
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung D Tran whose telephone number is (571) 272-3025. The examiner can normally be reached on 9:00 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Dzung Tran  
06/10/2005